

# PEDIATRIC NEUROLOGY BRIEFS

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### ATTENTION AND LEARNING DISORDERS

#### **RIGHT PREFRONTAL CORTEX AND ADHD**

The relation between MRI anatomical measures of specific frontostriatal structures (prefrontal cortex and basal ganglia) and response inhibition deficits observed in attention deficit hyperactivity disorder (ADHD) was studied at the Western Psychiatric Institute and Clinic, University of Pittsburgh, PA; and the National Institute of Mental Health, Rockville, MD. Compared to 26 normal control volunteers, 26 children with ADHD had significantly slower mean reaction times and lower mean accuracy rates on three response inhibition tasks. The tasks measured response inhibition at different stages of attentional processing (sensory selection, response selection, and response execution). MRI volumetric analyses showed that the prefrontal cortex, caudate nucleus, and globus pallidus correlated with task performance, and the putamen measures did not. Correlations between task performance and prefrontal and caudate volume involved predominantly the right hemisphere. Sensory selection correlated with right prefrontal and caudate measures, while response selection and execution correlated with caudate symmetry and left globus pallidus measures. Only prefrontal measures correlated with performance of inhibitory responses. (Casey BJ, Castellanos FX, Giedd JN, Rapoport JL et al. Implication of right frontostriatal circuitry in response inhibition and attention-deficit/hyperactivity disorder. J Am Acad Child Adolesc Psychiatry March 1997;36:374-383). (Reprints: Dr Casey, Western Psychiatric Institute and Clinic, E-519, University of Pittsburgh Medical Center, 3811 O'Hara Street, Pittsburgh, PA 15213).

COMMENT. These MRI anatomical and behavioral correlations in ADHD children demonstrate a role of the right prefrontal cortex in attentional control and inhibiting responses, whereas the basal ganglia are involved in motor control and the execution of behavioral responses. Distractibility and impulsivity in ADHD children reflect deficits in response inhibition.

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